

ABSTRACT

Problems to be solved by the present invention are to suppress increase in friction torque in an operation under an applied preload thereby suppressing heat generation and wear of a bearing, and to realize a low-noise and low-vibration operation at a high-speed rotation in addition to enhancement of a bearing life.

Let d designate the diameter d of the ball (17) in a four-point contact ball bearing (11). Let D_p denote the diameter of a pitch circle of plural balls (17) disposed between both raceway surfaces (13a, 15a). Let L_1 designate an inter-ball distance between the adjacent balls (17) on the pitch circle having the diameter D_p . Let r denote a curvature radius of each of grooves serving as raceway surfaces (13a, 15a), which circumscribe the ball (17) on the outer and inner races (13, 15), respectively. Let α designates a contact angle between the ball (17) and each of the raceway surfaces (13a, 15a). According to the present invention, these variables d, D_p , L_1 , r, and α are controlled according to predetermined relations. Thus, in a condition under an applied preload, in which the axial gap SA is negative, increase in friction torque can be suppressed. Thus, heat generation and the wear of a bearing can be suppressed.